

# SCIENCE & GOVERNMENT REPORT

The Independent Bulletin of Science Policy

Vol. VIII, No. 15

P.O. Box 6226A, Washington, D.C. 20015

September 15, 1978

## Tobacco Politics: The "Safer" Cigarette Flap

Gio Gori, the National Cancer Institute official who correctly, but imprudently, suggested that some cigarettes — though not safe — are safer than others, has taken temporary shelter at the Johns Hopkins School of Public Health, where he will spend the next nine months in a master of public health program.

Gori's move to academe will not wholly separate him from NCI affairs, since he will retain directorship of the Institute's program on smoking and health. But since he and the program are in disfavor with the NCI leadership, it is doubtful that he will figure significantly in the federal government's schizophrenic relationship with tobacco.

The transition to the student life for this senior research administrator was in the works long before last month's eruption over his forthcoming article in the *Journal of the American Medical Association*, wherein he reported that some current brands have been denatured to the point where their nastiness is now a

wasn't going to hurt their interests. In fact, Mr. Carter, in the course of a tour that took him through a tobacco warehouse, told his appreciative, but apprehensive, listeners that the federal government aimed "to make the smoking of tobacco even more safe than it is today." Though it is doubtful that Mr. Carter knew that back there in Bethesda, Md., one Gio Gori had been laboring for five years to fulfill this objective, and that he had collected reliable evidence to demonstrate that partial success had been achieved, there was no reason for Gori's superiors to be astonished by these facts.

Gori's JAMA paper is essentially an extension of a paper he published in *Science* in 1976, the main difference being that in the forthcoming article, he lists the contents of various brands, whereas in the earlier

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### OTA Study Faults

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mere fraction of those that were on the market in 1960. But, given the flap produced by the article, Gori deemed it wise to make a go decision on returning to school, and off he's gone, to add a master's degree to the Ph.D. in microbiology that he received 20 years ago.

What's left behind, however, is a nice lesson in tobacco politics, a governmental area that is dominated by vast hypocrisy, big money, and, in the present period, the faltering fortunes of Jimmy Carter.

Gori, it should be noted, spent the past five years as director of a program, which was begun in 1968, to develop safer cigarettes. Under his supervision, the US government expended some \$18 million toward this goal, while in various subtle ways it prodded the tobacco industry toward the same objective. While opponents of the weed may gag on the proposition that there can be anything such as a "safe" cigarette, there is no doubt that NCI has been working on its development, with Gio Gori in administrative command of the operation.

Furthermore, just prior to the disclosure of Gori's JAMA paper, none other than Jimmy Carter traveled to North Carolina, heart of tobacco land, to assure the financial beneficiaries of that crop that the government

## In Brief

The Office of Management and Budget has directed federal agencies to adopt a use-it-or-lose it policy for grantees whose awards are supposed to be expended in a given period. A memo from OMB Director James T. McIntyre states that "There is no reason why federal funds should be held outside the Treasury awaiting the closeout of a grant."

OMB tells SGR that this means that if money remains after the work is completed, it's got to be returned to the government, or, if a continuing grant is involved, "new" money will be withheld and replaced by the carryover.

The Administration's drive to slash the number of government advisory committees is proving burdensome for NIH's study section system. In 1969, NIH used 48 study sections to review 8227 grant applications; last year, 50 study sections handled 17,741 applications. Meanwhile, staff support in the Division of Research grants dropped from 425 to 392 during that period.

The Committee on Human Rights of the National Academy of Sciences has taken a stand against any communitywide policy on dealings with the Soviets, whose rough treatment of dissident Soviet scientists it has regularly deplored. "...each American scientist, contemplating a visit to the USSR (or asked to host a Soviet scientist in the US) must determine his or her own course of action," the committee states.

## ... Califano's \$6 Million "War" on Smoking

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publication he dealt generally with the subject of so-called safer cigarettes.

Nevertheless, the high command of the government health establishment chose on this occasion to roll out its heavy artillery. Surgeon General Julius B. Richmond proclaimed that "There is no known safe level of smoking of any cigarette of any type. No one should be misled by Dr. Gori's study into the belief that there is some way that one can adjust one's smoking habits and the cigarette one smokes and thus avoid all health risks. Stopping smoking completely, on the other hand, has a dramatic beneficial effect."

At the same time, Gori's boss, NCI Director Arthur Upton, and Robert Levy, director of the National Heart, Lung and Blood Institute, issued a joint statement which said, "While some research has tended to show that reduced tar and nicotine reduces the risks of cancer, we do not know with any certainty how much risk is reduced." To which they added, "We fear that Dr. Gori's paper may mislead the public. We are even more concerned about his assertion that the risk involved with low-tar-and-nicotine cigarettes is 'tolerable.'"

(This last point was an unfair jab, since Gori had not said that the risk is "tolerable," but rather had merely speculated that if death rates from cigarette-induced illness fell sharply, they might be regarded as "socially tolerable," in the sense they wouldn't be glaringly evident, as they now are, in mortality statistics.)

Whatever the case, a search for the origins of this irritable reaction to a reasonable thesis leads to the peculiarities of the federal government's so-called war against smoking. The basic fact is that it is a very small, carefully regulated war, never so large as to offend the tobacco industry, but large enough to save the consciences of officials who feel that the cigarette menace requires some government action.

Thus, Joe Califano, the Napoleonic commandant of HEW, thunders about the evils and costs of smoking, but when it comes to spending government money on the problem, Califano comes up with \$6 million for

education programs and \$20 million to investigate the psychology of smoking. It must be conceded that there's growth in those figures, though how much is difficult to say, given the numerological hanky-panky that accompanies government activities in this area. But when these sums are compared with the \$300 million a year that the cigarette industry spends to promote the top 20 brands, it is difficult to conclude that the federal government is seriously working against the habit.

And the reason for this is apparent in the economics of tobacco. In an era of big agriculture, tobacco remains a small-scale product, thanks to the government's price-support system, which limits guarantees to holdings of only a few acres. Thus, government figures show that last year, 370,000 farms produced 1.9 billion pounds of tobacco, for a cash return of \$2.3 billion. Some 600,000 families shared in this take — which is not unrelated to the President's recent pilgrimage to tobacco country.

Tobacco's strong political base thus assures that no President — not even one who is piously dedicated to holding down health-care costs — will dare initiate an all-out war against the product. Which means, in turn, that his appointed health officials, all of whom would like to see greater resources directed against smoking, fear the tactical danger in anything suggesting a federal endorsement of the concept of "safer" cigarettes. Messrs. Califano, Richmond, Upton and Levy have no difficulty in recognizing the validity of Gori's concept — that "safer" does not mean "safe," but that given the fact that 50 million Americans continue to smoke, it would be prudent for them to smoke less harmful cigarettes; further, that cessation programs should continue and that reduced-tar-and-nicotine cigarettes are probably easier to kick than higher-octane ones.

Quite sensible, but for the problem that the Gori thesis invites the argument that if safer cigarettes are here, there is no need for the government to sermonize on the dangers of smoking. Industry, with its formidable resources for manipulating public under-

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ISSN 0048-9581

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Independently published by *Science & Government Report, Inc.*, twice monthly, except once each in January, July and August. Annual Subscription: Institutions, \$84.50 (two years, \$149.50); individuals, \$44 (two years, \$75). Editorial offices at 3736 Kanawha St., N.W., Washington, DC 20015. Tel. (202) 244-4135. Second class postage paid at Washington, DC. Please address all subscription correspondence to Box 6226A, Northwest Station, Washington, DC 20015. Reproduction without permission is prohibited. SGR is available on Xerox University Microfilms.

## Vanguard of Chinese Students Due Next Year

China's expressed desire to send a stream of students to American universities has so far encountered no hitches, and it is now expected that a handful will arrive this winter, and that perhaps as many as 500 will be enrolled for the 1979-80 academic year.

American officials are still a bit bedazzled by the suddenness of the Chinese request for access to American universities, and a sense of uncertainty still surrounds the questions of how many, where, when, and how these young people will adapt to American campus life. And still to be resolved is the matter of reciprocal access for Americans who want to spend time in China.

Progress toward clarifying these and related matters is expected to come from a visit to Washington early next month by a delegation headed by Chou Pei-Yuan, who is president of Peking University as well as a top official of the Chinese Academy of Sciences.

By all accounts, the representatives of the People's Republic of China have been highly accommodating in the few negotiations that have so far taken place. The view from the American side is that the Chinese are extremely eager to place their students here, and that they are willing to go to considerable lengths to overcome any problems that might get in the way of that goal.

Within academe, the sudden prospect of a booming China connection is being happily received. Officials of some 25 representative universities and five national educational associations met August 24 in Washington to discuss China's request with officials of the National Science Foundation, the White House science office, and the Committee on Scholarly Communication with the PRC. The consensus of that meeting was that American institutions can absorb fairly large numbers of Chinese students; how many the Chinese want to have here at any one time is not known, but their plans for worldwide placements may run as high as 10,000, if some reports are to be credited.

### TOBACCO

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standing, can be expected to pick up on that one.

What it all comes down to is that it's okay for the President to tout safer smoking. But in the beleaguered camp of the government's anti-smoking forces, that's a dangerous message.

While Gori is back in academe, he will remain a government employee and can later return to NCI. But the clear lesson of this episode is that the politics and science of tobacco are very different entities, and a politically naive researcher has to be careful of what he says on this subject — even when he's on sound scientific grounds. —DSG

### San Mao After the Downfall of the 'Gang of Four'

We Love Science



The "Peanuts" of China, "San Mao" ("Three Hairs"), has adopted the theme of scientific modernization, as can be seen in the August issue of *China Reconstructs*, a monthly magazine that the PRC publishes for foreign audiences.

The Chinese have indicated that they are interested in all fields of study, but they are mainly interested in disciplines that tie in with their longterm plans to achieve world standards in science and engineering (SGR Vol. VIII, No. 8).

What's intriguing from the American perspective is that, in contrast to other Communist nations, the Chinese are not confining themselves to sending a few handpicked advanced students or senior researchers to look in on the American scene. Rather, they're aiming at sending thousands — starting with teen-age undergraduates and on upwards to senior professionals. From the outset, they have made it clear that they will pay all costs for their students. This financial element is, of course, not decisive in the receptivity that American universities are showing toward this pending influx of students; on the other hand, given the shaky finances of most academic institutions, cash customers, at the very least, are less troublesome.

In any case, a fairly optimistic spirit surrounds the cumbersome administrative task of actually getting the students over here and into suitable universities and

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## Academy Still at Work on Big Energy Study

A year behind schedule and \$1 million over original estimates, the National Academy of Science's mammoth study of Nuclear and Alternative Energy Systems is creaking ahead, though, as the Academy concedes "A completion date for the full . . . report is not yet available."

In backwards fashion, however, what are now available are two "supporting papers," "Problems of Uranium Resources and Supply to the Year 2010," by Leon T. Silver, of Caltech, and "Energy Modeling for an Uncertain Future," produced by a group chaired by Tjalling Koopmans, of Yale University. (They can be had for \$6 and \$9.75, respectively, from the Office of Information, NAS, 2101 Constitution Ave. Nw., Washington, DC 20418).

The study, ordered in July 1975 by the Energy Research and Development Administration, which has since metamorphosed into the Department of Energy, is another in a long series of catastrophes under the auspices of the venerable NAS and its associated subsidiaries, in this case, the National Research Council Assembly of Engineering, which is running the study.

Chaired by Harvey Brooks, of Harvard, and Edward L. Ginzton, of Varian Associates, the study was intended to leave nothing unknown about its subject matter, and to achieve this goal, a distinguished 16-member committee was selected to preside over the work of four panels, 25 sub-panels, involving, all in all, some 250 specialists drawn from all over, for a total expenditure so far of \$3 million.

The difficulty, however, has been that all this part-time talent is difficult to orchestrate. The study

was six months late in getting started, which is not uncommon for so massive an undertaking. But when the participants finally got their findings down on paper, the Academy's own Report Review Committee—which is not notoriously stern in its editorial scrutiny — bucked back big chunks of it as unacceptable for publication. This has happened at least twice, as far as SGR can determine, and, at this writing, what is purported to be a final draft is still undergoing examination by the reviewers.

Meanwhile, embarrassment and weariness have mounted to the point where the presiding committee has decided that whatever is publishable should be let out of the building, though in the case of the aforementioned supporting papers, an accompanying announcement states that "The findings reported in these papers are those solely of their authors and are not necessarily endorsed" by the committee or the National Research Council.

What must be noted about this lengthy affair is that it is more in the tradition of the old Academy than of the present-day Academy. When Frank Press became White House science adviser, he told his old friend Phil Handler, president of the Academy, that the Administration would like to make use of the Academy's services, but that glacial time would not do. The energy study, of course, was underway at that point, and, short of reorganizing it, there was no possibility of a speedup.

In other areas, however, the Academy has since demonstrated an ability to move quickly, and, on a number of occasions, has responded in a matter of a few weeks to requests for advice.

## CHINA

*(Continued From Page 3)*  
programs of study.

The few students that are here, or soon expected, for the new academic year are said to be relatives of Chinese-Americans who have assisted with the details of transportation and enrollment. But by next year — a rather short time, given the many problems involved — it is expected that the PRC presence on American campuses will be well established and growing.

Meanwhile, the reciprocity issue is getting attention in Washington. It is doubtful that comparable numbers of Americans would be interested in long-term study in China. But scores, if not hundreds, of American scholars of one sort or another can claim reasons for research there or for establishing ties with Chinese colleagues. Since the politics of the situation demands some sort of reciprocity on the part of the Chinese

government, it is, in fact, essential that the traffic goes in both directions, even if the headcount is predominantly in this direction. The sums involved for implementing reciprocity would not be large, but in these allegedly trying times, even small sums are difficult to wring out of existing budgets. This being so, NSF is looking into the financial aspects, and it's likely that a request for China travel funds will be included in its next budget submission.

All in all, the Sino-American academic alliance seems to be developing without any difficulty. The only upset so far apparent is in the Soviet Union, whose news agencies now and then issue a tirade of ominous warnings about the "China card," including its academic aspects. But, since distress for the Soviets was surely intended when the Administration decided to get closer to the PRC, the thunder from Moscow is going unnoticed.



## OSTP Invites Reports on Research Red Tape

*The White House science office is expressing puzzlement over a negligible response so far to invitations that it issued to various scientific societies in recent months for comments on red-tape and related problems encountered in performing biomedical research with federal support. Lest our leaders get the impression that everything is okay out there, SGR herewith echoes the invitation and suggests that suffering parties quickly dispatch replies. Address them to: Dr. Gilbert Omenn, Office of Science and Technology Policy, Executive Office Building, Washington, DC 20500. (At your discretion, and with confidence assured, if requested, SGR would welcome a copy. Send to SGR, PO Box 6226, Washington, DC 20015).*

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I am writing to elicit your help in identifying and solving some of the administrative problems which affect the efficiency of the biomedical research establishment. I raised these issues during testimony at the Special Hearing on Basic Biomedical Research before the Senate Appropriations Subcommittee on January 19, 1978, at the FASEB (Federation of American Societies for Experimental Biology) Annual Meeting in Atlantic City on April 10, 1978, and at other smaller meetings. Unfortunately, we have received little or no response thus far.

President Carter is determined to sustain his strong commitment to basic research in general and health-oriented research, in particular. At the same time, the President is attempting to reduce the federal deficit and the Congress continues to mandate new responsibilities and demand administrative and fiscal accountability.

In light of these realities, it seems appropriate to take a special look at the non-budgetary factors which may constrain the performance of biomedical research and reduce the efficiency of the overall biomedical research enterprise. Examples of such constraints include:

1. The administrative demands of Federal rules and regulations covering affirmative action, equal opportunity in employment, informed consent by human subjects, animal care, laboratory safety standards, privacy, freedom of information, and others;
2. The paperwork to demonstrate accountability;
3. A decrease in grant periods and inflexibility in granting procedures;
4. Rapid shifts in priorities of certain funding agencies; and
5. The loss of independence of investigators as researchers aggregate themselves into program projects and centers.

I would appreciate your assistance in defining these administrative constraints and identifying possible changes which could ease the burden they engender. The following questions may provide a useful format:

1. Which specific non-budgetary requirements, regulations, guidelines, and practices individually, or collectively, impose an excessive administrative burden on the individual investigator? Or are most of these responsibilities actually handled by administrative staff in the University?

2. For each case, how does the specific requirement affect the investigator? That is, what is the direct or indirect impact of the requirement on the investigator in terms of time, money, independence, etc.? For each case, what is the source of the requirement and its ostensible rationale?

3. For each case, what specific proposal would you make for relieving the burden on the investigator, recognizing institutional and national objectives of the various regulations and guidelines?

I realize this review will take some time and effort. However, if we are to make any progress in this area, we will need to have more specific information than I have been able to obtain thus far. Armed with such specifics, I will work with the appropriate agency officials to determine what administrative changes can be implemented.

Many thanks in advance for your help in this matter.

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and Economic Services  
Office of Science and Technology Policy

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## NBS Research Catalog

*Publications of the National Bureau of Standards, a catalog listing the nearly 1900 scientific and technical papers published last year by that government agency, is available for \$7.50 per copy from the US Government Printing Office, Washington, DC 20402. (Specify NBS Special Publication 305, Supplement 9; Stock No. 003-003-01951-8.) Add \$1.85 for orders outside the US.*

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## New VA Medical Chief

James C. Crutcher, a career physician with the Veterans Administration, has been appointed Chief Medical Director of the VA, succeeding John D. Chase, who recently retired after 12 years in the post.

## GM Sets Up Three \$100,000 Cancer Prizes

Three big cash prizes for cancer research, plus a generous, though relatively modest, one for astrophysics have been established in recent weeks.

The cancer awards, of \$100,000 each, will be given by a newly created General Motors Cancer Research Foundation; they may be given annually, though not necessarily so, upon the recommendation of an "awards assembly" chaired by Jonathan E. Rhoads, a University of Pennsylvania surgery professor who has long been active in cancer politics.

Named after historic figures in the GM empire, the awards are for basic research (honoring Alfred P. Sloan); diagnosis and treatment (Charles F. Kettering), and prevention (Charles S. Mott).

According to a GM announcement, the first awards will be made next March. GM says the corporation will play no role in the selection process, which will be left entirely to the awards assembly, consisting of up to 25 scientists and physicians.

Meanwhile, the American Institute of Physics has announced that it will annually award \$5000 to accompany a new prize for astrophysics. Funds to finance 10 of these awards have been provided by Heineman Foundation for Research, Educational and Charitable

Purposes, which also stakes the Mathematical Physics prizes that AIP has awarded since 1959. Heineman, who died in 1959, was a Belgian utility magnate.

Given the near-universal lament about a dearth of funds for the conduct of research, it might be worth considering whether these big bonanzas for past achievement actually represent an optimal use of philanthropic funds. But that issue rarely gets public examination.

Almost invariably, the winners of such grand prizes are well established in their careers and at least reasonably well off. Furthermore, there is no firm evidence that prizes actually serve as an indispensable spur to scientific accomplishment. Peer approval, the sociologists of science tell us, is what moves the profession, and that, of course, is available without big cash awards.

Might it not be prudent, then, given what we're told about the difficulties of young researchers getting launched, for these funds to go to post docs and others trying to get on with their scientific careers?

Of course it would. But prize giving makes the benefactors feel good, and since it's their money, they're inclined to place it where they choose.

## Energy Group Visits Japan

A delegation headed by John Deutch, director of energy research for the Department of Energy, visited Tokyo September 4-5 to discuss the so-called Fukuda initiative — a proposal for Japanese-American energy-research cooperation raised last May by Japanese Prime Minister Fukuda.

According to a DOE announcement, "The goal of the proposed cooperation is to pool US and Japanese financial and intellectual resources to support the development of new technologies which can provide benefits at the end of this century and into the 21st century. Joint projects to be considered," the announcement stated, "include coal liquefaction, nuclear fusion, solar energy, geothermal energy, and high energy physics."

## Keeping Up With the NSF

To keep abreast of applications deadlines, staff appointments, program notices, and so forth at the National Science Foundation, sign up for a free subscription to NSF's monthly *Bulletin*. Address orders to: National Science Foundation, Public Information Branch, 1800 G St. Nw., Washington, DC 20550.

## In Print

Following are some recent publications of the Scientific Manpower Commission, which was created by a consortium of 11 major scientific societies to collect data and conduct studies on training, employment, and remuneration of scientists and engineers:

*Salaries of Scientists, Engineers and Technicians*, eighth edition, 122 pages, lists starting and advanced salaries in industry, government, and academe; \$15.

*Supply and Demand for Scientists and Engineers*, 54 pages, a field-by-field assessment, including supply and demand projections for the next decade; \$3.00.

*Manpower Planning for Scientists and Engineers*, 56 pages, report of a 1977 workshop on various data collection services, methods for assessing supply and demand, relevant federal policies, and opportunities for women and minority group members; \$2.

*Professional Women and Minorities*, A Manpower Data Resource Service, basic book, plus 1976-77 supplements, described as "A comprehensive loose-leaf book of manpower data in all professional fields ... subdivided by sex and/or minority status"; \$75.

Orders should be addressed to the Scientific Manpower Commission, 1776 Mass. Ave. Nw., Washington, DC 20036.

# Plutonium Exposure Closes UK Weapons Plant

London. Britain's top-secret weapons research program was thrust into the limelight recently when the plutonium facilities at the Aldermaston Atomic Weapons Research Establishment (AWRE) were closed down. The Ministry of Defence (MOD) took this action after it was revealed that a number of workers at AWRE had been contaminated and had plutonium in their lungs. The contamination came to light as a result of a new monitoring program. Earlier in the year AWRE began to send its employees to the nearby Harwell research complex — home of both the UK Atomic Energy's major research establishment and of the National Radiological Protection Board, among others — for whole-body monitoring. These tests showed that perhaps 12 people had inhaled plutonium and that the readings were over the recommended safety levels set down by the International Commission on Radiological Protection. The first revelations concerned three women who worked in the AWRE laundry, but a day later the contamination of nine more workers was revealed. That the news was ever made public is something of an event. The MOD never talks about what goes on at Aldermaston, and there is none of the public interest in its activities that there is over the Rocky Flats, Colorado, plant, for example. It was almost certainly the concern of the unions that prompted the MOD to disclose the plutonium contamination.

The unions with members working at AWRE were growing increasingly worried at the contamination of their members, and it is quite likely that had the MOD not acted to break the news of the affair the unions would have leaked it. The unions were critical of the AWRE's medical performance since they later found that workers had in the past exceeded the plutonium safety limits but nothing had been done about it, nor had the contaminated workers been advised of their exposure.

Soon after the story broke, it began to seem as if the contamination had not been as bad as was first thought. Whole-body monitoring may be a lot better than the conventional badge techniques for measuring plutonium exposure, but it is still far from perfect. Second tests on the contaminated workers were said to have showed that for some of them the level of contamination was nowhere near as high as was originally thought.

However, this did not silence the critics, and the government decided to shut down the plutonium facilities and call in an independent expert to look into the affair. The man it chose was Sir Edward Pochin, an eminent radiologist who had advised Mr. Justice Parker during his inquiry into the proposed expansion

of the Windscale fuel reprocessing plant. Pochin began his study a week after the contamination was first revealed. Whatever the outcome of the inquiry, which is expected to be finished by the end of October and which may or may not be published, in full or in part, depending on the decision of the Defence Ministry, the MOD will have to do something to improve its monitoring system if it is to regain the confidence of its workers. If nothing else it will have to eliminate the barriers of secrecy and set up a monitoring system at least as good as that of the civil nuclear program. One problem at AWRE has been the difficulty of allowing the National Radiological Protection Board, Britain's radiation safety watchdog, to inspect the top secret establishment. For some time now the NRPB has been telling the AWRE to implement whole-body scanning, but Aldermaston will not have a scanner before next year.

An interesting secondary problem has also come into view as a result of the AWRE incident. The responsibility for ensuring that workers are not subjected to unsafe working conditions rests with the Health and Safety Executive. But the HSE is, like the Ministry of Defence, a Crown body. And the Crown cannot sue itself, so HSE could not take the MOD to court over the plutonium contamination. If nothing else, this episode is likely to nudge the government into acting, as it has said it will, to remove this anomaly.

Exactly what work has been shutdown at Aldermaston isn't clear, but several hundred workers are involved. Some speculation has it that the research in question was into the development of new warheads for Britain's Polaris missiles, but the MOD certainly isn't ready to deny or confirm this. —MK

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## OTA Cautions on R&D Demonstration Projects

The Congressional Office of Technology Assessment has taken a look at one of the big growth sectors in federal support of research and development, "demonstration projects" — which now consume over \$1 billion a year. And OTA's examiners report that they were not favorably impressed with what they found.

In a newly issued report titled, "The Role of Demonstrations in Federal R&D Policy," they conclude that, while some demonstrations have been useful for showing how a new technology performs in conditions resembling real-life operations, the process is often accompanied by so much hucksterism and glossing over of difficulties that the results may be far from trustworthy.

The study, dealing with demonstrations ranging from health-related technologies to solar-energy applications, is especially sharp in its discussion of Congressional pressures to promote new technologies by pushing them to the demonstration stage.

Thus, it warns that the fact that something works, doesn't mean it will sell, and that "Congress should expect a low rate of success with demonstrations as a means of promoting the use of new technology," adding that "Congress should expect that the information it receives concerning the potential of a proposed demonstration will probably be biased and imperfect."

The OTA study also warns that demonstration results are often so ambiguous they provide little useful guidance for objective policymaking; nevertheless, proponents of the new technology, being closest to what they're trying to sell, are in an advantageous position to argue that the demonstration has been satisfactory.

Using weapons development as a case in point,

the study states that "In the development of large-scale technology, there frequently is pressure both to advance technology and demonstrate its usefulness in a single project; this approach can have unfortunate outcomes. Experience with the development of major weapons systems is instructive... The military has often attempted to compress development times of weapons systems by initially purchasing a sufficient number of completed weapons systems permitting realistic operational testing... Enthusiastic supporters of a weapons system do not want it to be discarded and thus seek the maximum commitment to the system. The industrial producers want to minimize the risk of cancellation. Most importantly, developers and sponsors of new technologies perpetually seem to underestimate the amount of uncertainty that exists with a new technology."

Though the report states that weapons development is a case by itself and that its lessons are not necessarily applicable to the overall problem of policy for demonstration projects, it concludes that:

"The Congress should seek to ensure that it does not add to the incentives for premature demonstration of an undeveloped technology by pressing to turn engineering tests into full-scale demonstrations."

And it concludes that projects conceived outside of the federal government are more likely to have the strong underlying support necessary for absorption into the economy than projects "developed in response to detailed solicitations by Federal agencies."

(Copies of the report, "The Role of Demonstrations in Federal R&D Policy," are available without charge from the Office of Technology Assessment, US Congress, Washington, DC 20510).

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